PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 27 00-02 – Air Barriers Performance
.2 Section 07 46 13 - Preformed Metal Siding
.3 Section 07 62 00 - Sheet Metal Flashing and Trim
.4 Section 07 92 00 - Joint Sealants
.5 Section 08 71 00 - Door Hardware
.6 Section 08 80 50 – Glazing

1.2 RELATED REQUIREMENTS

.1 Canadian Standards Association (CSA International).
.1 CSA A440.2-04, Energy Performance of Windows and Other Fenestration Systems.
.2 CSA Certification Program for Windows and Doors.

.2 National Fire Protection Association (NFPA).
.1 NFPA 80-1999, Standard for Fire Doors and Fire Windows.
.2 NFPA 252-1999, Standard Method of Fire Tests of Door Assemblies.

.3 Underwriters' Laboratories of Canada (ULC).
.1 CAN-4S104M-80(R1985), Fire Tests of Door Assemblies.
.2 CAN4-S105M-85 (R1992), Fire Door Frames Meeting the Performance Required by CAN4-S104.

.4 Successfully completed 1,000,000 cycles test in accordance with: AAMA 920-03 – Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems

.5 Laminate Properties:
.1 Door face plate is a minimum of 3.2 mm thick fiberglass reinforced plastic molded into one continuous sheet starting with a 0.63mm resin-rich gelcoat layer resin integrally molded with multiple layers of 457 g/sq. m fiberglass mat and one layer of 610 g/sq. m fiberglass woven roving saturated with special resin. Door plate weight shall not be less than 4.74 kg at a ratio of 30/70 glass resin.

.1 ASTM D 638 Tensile Strength Properties of Plastic
.2 ASTM D 790 Flexural Strength Properties of Plastic
.3 ASTM D 2583 Indention Hardness of Plastics
.4 ASTM D 256 Izod Pendulum Impact Resistance
.5 ASTM D 792 Density/Specific Gravity of Plastics
.6 ASTM D 1761 Mechanical Properties of Fasteners
.7 ASTM E 84 Surface Burning Characteristics of Materials
.8 ASTM G 155 Xenon Light Exposure of Non Metallic Materials

.9 ASTM D 635 Method For Rate of Burning
.10 ASTM D 2843 Smoke Density
.11 ASTM D 1929 Self Ignition Temperature Properties

.6 Core properties:
.1 ASTM C 177 Thermal Properties of Materials
.2 ASTM D 1622 Density and Specific Gravity
.3 ASTM E 84 Surface Burning Characteristics of Materials
.4 ASTM D 635 Method For Rate of Burning
.5 WDMA TM-10 and TM-5 Firestop
.6 ASTM E 152 U.L 10(b)
.7 ASTM E90-04- Sound Transmission Loss
.8 ASTM E413-04- Classification For Rating Sound Insulation
.9 ASTM E1332-90- Standard Classification For Determination Of Outdoor-Indoor Transmission Class
.10 ASTM E2235-04- Standard Test For Determination Of Decay Rates For Use In Sound Insulation Methods

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
.1 For caulking materials during application and curing.
.2 For door materials and adhesives.

.2 Shop Drawings:
.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Indicate door types and cutouts for lights and sizes, core construction, transom panel construction and cut-outs.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit one 300 x 300 mm corner sample of each type FRP door.

.3 Show door construction, core, glazing detail and faces which represents all aspects of the typical manufacturing process, including molded in gelcoat color and face plate construction. One edge should expose the interior of the door depicting the continuous piece stile and rail, hardware reinforcement and core material.

.4 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 FRP fire rated doors: labeled and listed by an organization accredited by Standards Council of Canada.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 11 55 – General Instructions

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Protection:

.1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.

.2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.

.3 Protect doors from scratches, handling marks and other damage. Crate doors.

.4 Store doors away from direct sunlight.

.5 Remove and replace damaged items that cannot be repaired to the satisfaction of the Departmental Representative.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Dispose of packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

.3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.4 Divert unused adhesive material from landfill to official hazardous material collections site approved by Departmental Representative

.5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 FIRE RATED AND NON-RATED DOORS

.1 Fibreglass Reinforced Plastic Doors:

1. Face Panels: Standard face panels shall be chemical resistant, using a fibreglass- reinforced polyester resin system with light stabilizing additives. Thickness of panels shall be 2.25mm to 3.175 mm, with a standard of 3.050 mm".
2. Door Thickness: 44.45mm
3. Finish: All surfaces shall have a textured, semi-gloss, seamless gel coat finish.

.2 Internal Construction:

.1 Stiles and Rails shall be constructed of rectangular and square high modulus pultruded fiberglass tubes.

.2 Core material as application dictates:

.1 Honeycomb Core, Phenolic impregnated resin honeycomb.

.2 Polyurethane Foam Core, 38 mm thick rigid block of polyurethane with an "R" factor of 11-12 shall be laminated to the interior of the face panels.

.3 Mineral Core, fire rated up to 90 minutes.

.4 Polypropylene honeycomb 38mm thick.

.3 Internal reinforcements for full mortise hinges to be solid FRP blocking and for thru-bolted hardware to be high modulus pultrusions.

2.2 GLAZING

.1 Glass: Refer to Section 08 80 50 Glazing.

2.3 FABRICATION

.1 Vertical edge strips to match face.

.2 Prepare doors for glazing. Provide glazing stops with mitered corners to match face.

.3 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and [1.5 mm in 50 mm] on hinge side.

.4 Radius vertical edges of double acting doors to 60 mm radius.

.5 Provide waterproof non-staining membrane at cutouts on exterior doors to exclude moisture from core.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

.1 Unwrap and protect doors in accordance with CAN/CSA-0132.2 Series, Appendix A.

.2 Install doors and hardware in accordance with manufacturer's printed instructions.

.3 Adjust hardware for correct function.

.4 Install glazing in accordance with Section 08 80 50 - Glazing.

.5 Install louvres and stops.

3.3 ADJUSTMENT

.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

3.4 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking; clean doors and frames.

.3 Clean glass and glazing materials with approved non-abrasive cleaner.

.4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 08 71 00 – Door Hardware
.2 Section 08 80 50 – Glazing
.3 Section 09 97 19 – Painting Exterior Metal Surfaces

1.2 REFERENCES

.1 ASTM International
.1 ASTM A 1008/A 1008M-10, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
.2 ASTM D 523-08, Standard Test Method for Specular Gloss.
.3 ASTM D 822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.105-M91, Quick-Drying Primer.
.2 CAN/CGSB-1.213-04, Etch Primer (Pretreatment Coating or Tie Coat) for Steel and Aluminum.
.3 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coatings.

.3 CSA International
.1 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 Green Seal Environmental Standards (GS)
.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
.1 SCAQMD Rule 1113-A2007, Architectural Coatings.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:
.1 Convene pre-installation meeting 1 week prior to beginning work of this Section and on-site installation, with Contractor's Representative and Departmental Representative
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Co-ordination with other construction subtrades.
.4 Review manufacturer's written installation instructions and warranty requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for doors, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia.
.2 Indicate sizes, service rating, types, materials, operating mechanisms, glazing locations and details, hardware and accessories, required clearances and electrical connections.

.3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.5 Manufacturers Reports:
.1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in Section 01 11 55 – General Instructions.
.2 Construction Waste Management:
.1 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.
.3 Low-Emitting Materials:
.1 Submit listing of primers, paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for sectional metal doors for incorporation into manual.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.7 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect sectional metal doors, hardware and accessories from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

.1 Design exterior door assembly to withstand wind load of 1.53 kPa with a maximum horizontal deflection of 1/240 of opening width.

.2 Design door panel assemblies with thermal insulation factor 3.51 RSI.

.3 Design door assembly to withstand minimum 15,000 cycles per annum, and 20 years total life cycle.

2.2 MATERIALS

.1 Galvalume steel sheet: commercial quality AZM150-metric aluminum-zinc coating.

.2 Primer: suitable for galvalume surfaces,
VOC and toxicity content of paints and coatings must be less than content limits of GS-11 and SCAQMD Rule 1113.
.1 VOC limit 250 g/L maximum to GS-11 SCAQMD Rule 1113.

.3 Insulation: to meet design requirements and to CCD-016.

.4 Glazing: refer to schedule and Section 08 80 50 – Glazing.

.5 Cable: multi-strand galvanized steel aircraft cable.

2.3 DOORS

.1 Fabricate 40.5 mm thick insulated flush panel doors of interlocking roll formed steel sections.

.2 Fabricate panel frames in a continuous box frame with vertical stiffeners at 600 mm centres.

.3 Install glazing for vision panels. Sizes and number of vision panels as indicated.

.4 Assemble components by means of spot or arc welding or coated rivet system or adhesive and self tapping screws to manufacturer's recommendations.

.5 Apply shop coat of primer after fabrication of door. Fabricate doors from prepainted steel stock.

VOC and toxicity content of paints and coatings must be less than content limits of GS-11 and SCAQMD Rule 1113.

.1 VOC limit 250 g/L maximum to GS-11 and SCAQMD Rule 1113.

2.4 STANDARD DUTY INDUSTRIAL HARDWARE

.1 Track: Re-use existing tracks if deemed in serviceable condition. Remove surface corrosion and apply zinc rich paint.

.2 Track Supports: Re-use existing track support if deemed in serviceable condition.

.3 Spring counter balance: heavy duty oil tempered torsion spring with manufacturers standard brackets.
.1 Drum: 133 mm diameter die cast aluminum.
.2 Shaft: 4 mm diameter solid steel.

.4 Top roller carrier: galvanized steel minimum 2.28 mm thick adjustable.

.5 Rollers: full floating, grease packed hardened steel, ball bearing minimum 75 mm diameter, stamped tire. Roller selection to match existing retained tracks.

.6 Roller brackets: adjustable, galvanized steel, minimum 2.5 mm thick.

.7 Hinges: standard duty industrial 2.28 mm thick stainless steel as

recommended by manufacturer.

.8 Cable: minimum 4 mm diameter galvanized steel aircraft cable.

2.5 ACCESSORIES

.1 Overhead horizontal track and operator supports: Use existing supports if deemed in serviceable condition – manufacturer to review and confirm that rollers and similar components will suit. Galvanized steel, type and size to suit installation.

.2 Track guards: 5 mm thick formed sheet 1500 mm high track guards.

.3 Pusher springs.

.4 Handles:

.1 Flat bar door latch with night latch and electric interlock switch.
.2 Handles: key handle operated from outside, handle operated from inside.
.3 Drop ring: outside drop ring handle for high lift doors.

.5 One Two horizontal sliding lock bolts on interior.

.6 Weatherstripping:
.1 Sills: double contact bulb type full width extruded neoprene weatherstrip.

.2 Jambs and head: extruded aluminum and arctic grade vinyl weatherstrip to manufacturer's standard.

.7 Finish ferrous hardware items with minimum zinc coating of 610 g/m² to CAN/CSA-G164.

2.6 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied polyvinylidene fluoride.
.1 Class F2S.
.2 Two colour selected by Departmental Representative from manufacturer's standard range.

.3 Specular gloss: 30 units +/- in accordance with ASTM D523.
.4 Coating thickness: not less than 0.051mm.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:
.1 Outdoor exposure period 5000 hours.
.2 Humidity resistance exposure period 5000 hours.

.2 Prefinished steel with factory applied polyvinyl chloride.
.1 Class F1S F2S.
.2 Two colour selected by Departmental Representative DCC from manufacturer's standard range.
.3 Specular gloss: 30 units +/-5 in accordance with ASTM D 523.
.4 Coating thickness: not less than 0.051mm.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D 822 as follows:
.1 Outdoor exposure period 5000 hours.
.2 Humidity resistance exposure period 5000 hours.

2.7 OPERATORS

.1 Equip doors for operation by:
.1 Hand, two handles on inside face of door.
.2 Chain hoist with galvanized steel chain.

.2 Cable fail safe device.
.1 Able to stop door immediately if cable breaks on door free fall. Braking capacity 500 kg.

2.8 ELECTRICAL OPERATOR

.1 Re-use existing operators and controllers.

.2 Supply and install 1 (one) electrical jack shaft to match original unit manufactured by Pores Automatiques Autodoor. 3 phase, 208/230 volts, 1HP motor , model MGH serial # 86-12190. Controllers are to match existing.

.3 Controller units with integral motor reversing starter, solenoid operated brake3 heater elements for overload protection, including two pushbuttons and control relays as applicable.

.4 For jack shaft operators:
.1 Provide floor level disconnect device to allow for manual operation in event of power failure.
.2 Equip Operator with:
.1 Electrical interlock switch to disconnect power to operator when in manual operation.
.2 Built-in chain hoist for manual operation in event of power failure.

.5 Automatic illumination complete with time delay, self extinguishing.

.6 Door speed: 300 mm per second.

.7 Control transformer: for 24 VAC control voltage.

.8 Mounting brackets: galvanized steel, size and gauge to suit conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for sectional metal doors installation in accordance with manufacturer's written instructions.

.1 Verify that existing tracks and attachments are acceptable and compatible with proposed sectional metal doors. Inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Install doors and hardware in accordance with manufacturer's instructions.

.3 Rigidly support rail and operator and secure to supporting structure.

.4 Touch-up steel doors with primer where galvalume finish is damaged during fabrication.

.5 Install operator including electrical motors, controller units, pushbutton stations, relays and other electrical equipment required for door operation. Re install electrical interconnect with heating equipment.

.6 Lubricate and adjust door operating components to ensure smooth opening and closing of doors.

.7 Adjust weather stripping to form a weather tight seal.

.8 Adjust doors for smooth operation.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
.1 Remove traces of primer; clean doors and frames.
.2 Clean glass and glazing materials with approved non-abrasive cleaner.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by sectional metal door installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry
.2 Section 07 27 00.02 - Air Barriers – Performance
.3 Section 07 46 13 - Preformed Metal Siding
.4 Section 07 62 00 - Sheet Metal flashing and Trim
.5 Section 07 92 00 - Joint Sealants
.6 Section 08 80 50 - Glazing
.7 Section 09 91 23.01 - Interior Painting

1.2 REFERENCES

.1 Canada Green Building Council (CaGBC)
.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
.2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
.2 CAN/CGSB-79.1-M91, Insect Screens.

.3 CSA International
.1 CAN/CSA-A440.2-09, Fenestration Energy Performance. CAN/CSA A440.4, Installation Standard.
.2 CAN/CSA-Z91-02(R2008), Health and Safety Code for Suspended Equipment Operations.

.4 Green Seal Environmental Standards (GS)
.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
.1 SCAQMD Rule 1113-A2007, Architectural Coatings.
.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.6 NAFS- North American Fenestration Standard/Specification for Windows, Doors and Skylights
.1 AAMA/WDMA/CSA 101/I.S.2/A440, NAFS- North American Fenestration Standard/Specification for Windows, Doors and Skylights
.2 A440S1 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440

.7 CAN/CSA-G164-Hot-Dip Galvanizing of Irregularly Shaped Articles

.8 CAN/CGSB-1.40-Primer, Structural Steel, Oil Alkyd Type.

.9 ASTM D4216, Standard Specification for Rigid Polyvinyl Chloride (PVC) and Related PVC and Chlorinated Polyvinyl Chloride (CPVC) Building Products Compounds.

.10 ASTM D4726, Standard Specification for Rigid Polyvinyl Chloride (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors

.11 Glazing Contractor's Association of B.C. (GCABC) publication: Glazing Systems Specifications Manual

.12 IGMA Glazing Recommendations for Sealed Insulating Glass Units.

1.3 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for windows and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia.

.2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim junction between combination units elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and caulking. Indicate location of manufacturer's nameplates.

.4 Samples:

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 Submit one representative model complete full size window sample of each type window.

.4 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.

.5 Include 150 mm long samples of head, jamb, sill, meeting rail mullions to indicate profile.

.5 Test and Evaluation Reports:

.1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:

.1 Windows classifications.

.2 Insect screens.

.3 Air tightness.
.4 Water tightness.
.5 Wind load resistance.
.6 Condensation resistance.
.7 Sash strength and stiffness - operable casement projecting.
.8 Ease of operation - windows with operable lights.
.9 Sash pull-off - vinyl windows.
.10 Forced entry resistance.
.11 Mullion deflection - combination and composite windows.

.6 Sustainable Design Submittals:

.1 Construction Waste Management:
.1 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.

.2 Low-Emitting Materials:
.1 Submit listing of sealants and paints, primers and coatings used in building, comply with VOC and chemical component limits or restriction requirements.

.7 Letters of Assurance: The Registered Professional Engineer who signed and sealed the shop drawings shall perform sufficient field reviews in order to provide a letter of professional assurance after completion of the Work, giving assurance that the Work has been fabricated and installed in general conformance with the sealed shop drawings. Approved forms are BC Building Code Letters of Assurance (Schedule C). Written inspection reports of field reviews shall be submitted promptly as the field reviews are made.

.8 Maintenance Data: Provide in accordance with Section 01 78 00 – Closeout Submittals, the following data for incorporation into specified maintenance manual:
.1 A recommended inspection procedure and schedule and component replacement schedule.
.2 Data for cleaning and maintenance of framing finishes, glazing and hardware.

.9 Warranties:

.1 Provide a written warranty signed and issued in the name of the Owner stating:
.1 All windows will be free from defects in material and workmanship for a period of two (2) years from the date of substantial Performance of the Work.
.2 All windows will continue to provide resistance to water penetration for a period of five (5) years from the date of Substantial Performance of the Work.

.3 All insulating sealed double glazing units shall be covered for a period of ten (10) years from the date of Substantial Performance of the Work, against material obstruction of vision as a result of hermetic seal failure and dust or film formation on inner glass surfaces.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for windows for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Install mock-up as directed by Departmental Representative, together with tie-in to the air barrier and accessories. Mock-up may remain as part of the finished work at the discretion of the Departmental Representative.

.3 Conduct water testing penetration in accordance with ASTM E1105-00 Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Wall and Doors by Uniform Static or Cyclic Air Pressure Difference, using Procedure B once 50% of the windows have been installed. Minimum of three tests are to be conducted to confirm that installed system meets the 600 Pa rating per AAMA/WDMA/CSA 101/I.S.2/A440. Cost of testing is to be included. Additional testing is to be conducted at the rate of 2 additional tests for each test that does not meet B6 rating. Construct chamber for testing as directed by Departmental Representative.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect windows from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Materials: to CSA-A440/A440.1 supplemented as follows:

.2 All windows by same manufacturer.

.3 Sash: vinyl.

.4 Main frame: vinyl.

.5 Glass: in accordance with Section 08 80 50 - Glazing.

.6 Sealants:
- .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.

2.2 WINDOW TYPE AND CLASSIFICATION

.1 Types:
- .1 Projected: bottom projected with double insulating glass.
- .2 Fixed: with double glazing insulating glass.
- .3 Screens: on ventilating portion of windows.

.2 Classification rating: to AAMA/WDMA/CSA 101/I.S. 2/A440.
- .1 Performance Class: CW – PG 85
- .2 Air tightness: A3.
- .3 Water tightness: 600 Pa
- .4 Wind load resistance: 4 Kpa.
- .5 Forced Entry: ASTM F588 (Grade 10, minimum).

2.3 FABRICATION

.1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S. 2/A440 supplemented as follows:

.2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or

less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.

.3 Face dimensions detailed are maximum permissible sizes.

.4 Brace frames to maintain squareness and rigidity during shipment and installation.

.5 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40 380 g/m² zinc coating to ASTM A123/A123M.

2.4 VINYL FINISHES

.1 Vinyl finishes: in accordance with CSA-A440/A440.1, including appendices, supplemented as follows:
.1 1 colour to match Departmental Representative's sample.

2.5 ISOLATION COATING

.1 Primers Paints Coatings: in accordance with manufacturer's recommendations for surface conditions.
.1 Primer: VOC limit 100 g/L maximum to GS-11 SCAQMD Rule 1113.
.2 Coating: VOC limit 250 g/L maximum to GS-11 SCAQMD Rule 1113.
.3 Paint: VOC limit 150 g/L maximum to GS-11 SCAQMD Rule 1113.

.2 Isolate aluminum from following components, by means of isolation coating:
.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
.2 Concrete, mortar and masonry.
.3 Wood.

2.6 GLAZING

.1 Glaze windows in accordance with AAMA/WDMA/CSA 101/I.S. 2/A440.

.2 Glazing Gaskets for PVC Sections: neoprene, thermoplastic rubber or EPDM, flexible at minimum design temperature, and as follows:
.1 Profiles with a minimum of two (2) fins to contact glazing at interior and exterior of glass units
.2 Designed to maintain pressure contact against glass units through design temperature range.
.3 Co-extruded gaskets are not acceptable on the main frame or sash.

2.7 HARDWARE

.1 Hardware: stainless steel or white bronze hinges and sash locks with aluminum handles to provide security and permit easy operation of units.

.2 Locks: provide operating sash with spring loading locking device, to provide automatic locking in closed position.

.3 Include special keyed opening device for windows normally locked.

.4 Hardware exposed to exterior environment with sash in closed and open positions shall be corrosion-resistant stainless steel or bi-chromated steel composites.

.5 Secure hardware and attachments using screws into H-ports or penetrating a minimum of two walls of framing. Provide metal reinforcement embedded in vinyl frames at screw attachment locations.

2.8 AIR BARRIER AND VAPOUR RETARDER

.1 Equip window frames with site installed air barrier material for sealing to building air barrier as follows:
.1 Material: compatible with, building air barrier materials to provide required air tightness throughout exterior envelope assembly.
.2 Material width: adequate to provide required air tightness to building air barrier from interior.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence Departmental Representative.
.2 Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Window installation:
.1 Install in accordance with CSA-A440/A440.4.
.2 Arrange components to prevent abrupt variation in colour.

.2 Sill installation:
.1 Form sills, complete with end dams to fit 25 mm longer than window frame width.
.2 Secure sills in place with anchoring devices located at ends

joints of continuous sills and evenly spaced 600 mm on centre in between.

.3 Fasten drip deflectors with self tapping stainless steel screws.

.4 Maintain 6 to 9 mm space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3 to 6 mm space at each end. Install splice plates at joints.

.3 Caulking:

.1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk splice plate joints in continuous sills.

.2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Departmental Representative.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by window installation.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
.1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
.2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
.3 ANSI/BHMA A156.3-2001, Exit Devices.
.4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
.5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
.6 ANSI/BHMA A156.6-2005, Architectural Door Trim.
.7 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
.8 ANSI/BHMA A156.13-2002, Mortise Locks and Latches Series 1000.
.9 ANSI/BHMA A156.15-2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
.10 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
.11 ANSI/BHMA A156.17-2004, Self-closing Hinges and Pivots.
.12 ANSI/BHMA A156.18-2006, Materials and Finishes.
.13 ANSI/BHMA A156.19-2002, Power Assist and Low Energy Power - Operated Doors.
.14 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.

.2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
.1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

1.2 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for door hardware and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.
.3 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
.4 After approval samples will be returned for incorporation in

Work.

.4 Hardware List:
.1 Submit contract hardware list.
.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions: submit manufacturer's installation instructions.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for door hardware for incorporation into manual.

1.4 MAINTENANCE MATERIALS SUBMITTALS

.1 Extra Stock Materials:
.1 Supply maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
.2 Tools:
.1 Supply 2 sets of wrenches for door closers locksets and fire exit hardware.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements:
.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and

location.

.4 Storage and Handling Requirements:
.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect door hardware from nicks, scratches, and blemishes.
.3 Protect prefinished surfaces with wrapping strippable coating.
.4 Replace defective or damaged materials with new.

.5 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.

.6 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 HARDWARE ITEMS

.1 Use one manufacturer's products only for similar items

2.2 DOOR HARDWARE

.1 All door hardware to be of stainless steel and to match existing function. Refer to door schedule on architectural drawings.

.2 Door bottom seal: heavy duty, door seal of extruded aluminum frame and solid hollow closed cell neoprene weather seal, surface mounted with drip cap recessed in door face, clear anodized finish.

.3 Thresholds: 150 mm wide x full width of door opening, extruded aluminum, plain serrated surface, with thermal break of rigid PVC, with lip and vinyl door seal insert.

.4 Weatherstripping:
.1 Head and jamb seal:
.1 Extruded aluminum frame and solid hollow closed cell neoprene nylon brush pile vinyl insert, clear anodized finish.
.2 Adhesive backed neoprene vinyl covered foam material.

.2 Door bottom seal:
.1 Extruded aluminum frame and closed cell neoprene nylon brush vinyl sweep, clear anodized finish.

.5 Astragal: adjustable compensating overlapping, extruded aluminum frame with vinyl pile insert, finished to match doors.

2.3 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.4 KEYING

.1 Keying is to match existing.

.2 Stamp keying code numbers on keys and cylinders.

.3 Supply construction cores.

.4 Hand over permanent cores and keys to Departmental Representative.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Supply fibreglass plastic reinforced (FRP)door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Supply manufacturers' instructions for proper installation of each hardware component.

.4 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).

.5 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.6 Use only manufacturer's supplied fasteners.

.1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.7 Remove construction cores locks when directed by Departmental Representative.
.1 Install permanent cores and ensure locks operate correctly.

3.2 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to ensure tight fit at contact points with frames.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.
.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
.3 Remove protective material from hardware items where present.
.4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 HARDWARE SCHEDULE

.1 For Hardware Schedule see drawing A10.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by door hardware installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 08 22 00 – FRP Doors and Frames
.2 Section 08 36 13.02 – Sectional Metal Doors
.3 Section 08 50 00 – Windows
.3 Section 08 87 53 – Security Films

1.2 REFERENCES

.1 ASTM International
.1 ASTM C 542-05, Standard Specification for Lock-Strip Gaskets.
.2 ASTM D 790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
.3 ASTM D 1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.
.4 ASTM D 1929-96(R2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.
.5 ASTM D 2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
.6 ASTM E 84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.
.7 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
.8 ASTM F 1233-08, Standard Test Method for Security Glazing Materials and Systems.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
.2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.
.3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
.4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
.6 CAN/CGSB-12.8-97, Insulating Glass Units.
.7 CAN/CGSB-12.8-97 (Amendment), Insulating Glass Units.
.8 CAN/CGSB-12.11-M90, Wired Safety Glass.

.3 Environmental Choice Program (ECP)
.1 CCD-045-95(R2005), Sealants and Caulking Compounds.

.4 Glass Association of North American (GANA)
.1 GANA Glazing Manual - 2008.
.2 GANA Laminated Glazing Reference Manual - 2009.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:
.1 Convene pre-installation meeting 1 week prior to beginning work of this Section and on-site installation, with Departmental Representative in accordance with Section 01 11 55 to:
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Co-ordination with other building sub-trades.
.4 Review manufacturer's written installation instructions and warranty requirements.

1.4 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia.

.4 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for reference on site.

.5 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.6 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.1 Submit testing and analysis of glass under provisions of Section 01 11 55.

.2 Submit shop inspection and testing for glass.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for glazing for incorporation into manual.

1.6 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Mock-ups:

.1 Construct mock-ups in accordance with Section 01 33 00 – Submittal Procedures.

.2 Construct mock-up to include glass glazing, and perimeter air barrier and vapour retarder seal.

.3 Mock-up will be used:

.1 To judge quality of work, substrate preparation, operation of equipment and material application.

.2 For testing to determine compliance with performance requirements. Perform tests as follows:

.1 Water penetration Testing in conformance with ASTM E-1105-00

.4 Locate where directed.

.5 Allow 72 hours for inspection of mock-up before proceeding with work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect glazing and frames from nicks, scratches, and blemishes.

.3 Protect prefinished surfaces with wrapping strippable coating.

.4 Replace defective or damaged materials with new.

1.8 WARRANTY

.1 All glass and glazing materials to be free from defects in material and workmanship, and continue to perform satisfactorily for a period of one (1) year from certified date of Substantial Performance of the Project.

.2 The insulated glass units (IGU) are to have a 10-year written warranty.

.3 The Contractor agrees to correct promptly at its own expense all defects and deficiencies in the work included in this section. In all cases, defective or deficient work shall be removed and replaced with work acceptable to the Departmental Representative, at no additional cost and at such times as the Departmental Representative may designate.

.4 For the purposes of this clause but without limiting the generality of this clause; defects or deficiencies shall include:

.1 Defects or deficiencies in design, workmanship or materials forming part of the work of this section.

.2 "Materials" shall include glass and glazing, aluminum, gaskets, tapes and sealants.

.3 With respect to sealed glazing units, hermetic seal failure, fogging, reflective coating defects, low emissivity coating defects, breakdown due to edge flaws (chips, gouges, etc.) migration of edge spacers and breakage due to thermal stress.

.4 With respect to spandrel glass, frit/scrim defects and breakage due to edge flaws (chips, gouges, etc).

.5 On or before the certified date of Substantial Performance of the Project, this contractor shall obtain and deliver to the Departmental Representative written warranties or guarantees, in the name of the Owner, from manufacturers of materials against defects or deficiencies of the type described in this clause

1.9 AMBIENT CONDITIONS

.1 Ambient Requirements:

.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Design Criteria:

.1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass in accordance with NBC and CGSB 12.20.

.3 Limit glass deflection to 1/170 flexural limit of glass with full recovery of glazing materials.

.4 Size glass to limit glass deflection, withstand wind loads and positive and negative live loads as noted in the National Building Code.

.5 Design glass to CAN/CGSB 12.20 using an annual probability factor of 1/10 years for the reference wind velocity, and 8 in 1000 glass failure rate under this load assuming glass strength has a coefficient of variation of 0.25. Limit glass deflection to L/175 to a maximum of 20mm under wind load.

.6 Design glass to withstand guardloads as required by the Building Code. Limit deflection to 12mm under guard load.

.7 Design glass to withstand thermal stresses imposed in service. In calculation, assume the use of blinds located not less than 50 mm from the inside surface of the glass.

.2 Flat Glass:

.1 Float glass: to CAN/CGSB-12.3, glazing quality, 6 mm thick minimum.

.3 Insulating Glass Units:

.1 Insulating glass units: to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

.1 Glass coating: surface number 3, reflective low "E" wet chemical deposition MSVD pyrolitic deposition colour.

.2 Inert gas fill: argon krypton.

.2 VOC limit 250 g/L maximum to SCAQMD Rule 1168.

.1 VOC limit: 5 % maximum by weight to CCD-045.

.2 Ensure sealant does not contain chemical restrictions to CCD-045.

.4 Georgian Wired Glass: to CAN/CGSB-12.11-M90, Wired Safety Glass. Polished Plate, 7mm thick.

.5 Glass setting and edge blocks: neoprene, EPDM or silicone with a Shore A hardness of 80-90 (+/-5) durometer to ASTM D2240, to suit glazing method, glass lightweight and area, formed to allow drainage and ventilation within the glazing pocket.

.6 Glazing Gaskets: continuous extruded neoprene, silicone rubber or EPDM, as recommended by framing system manufacturer.

.7 Glazing tapes and sealants as recommended by framing manufacturer. Wet glazing tapes subjected to wind loads must have a continuous integral rubber shim to prevent pump out.

.8 All glazing materials to be compatible with materials they contact.

.1 Setting blocks to be compatible with insulating glass edge sealants. Setting blocks for insulating glass units with silicone perimeter seals must be silicone.

.2 Sealants in contact with edges of insulating glass to be compatible with insulating glass edge sealants.

.3 Heel, toe and cap sealants to be compatible with glazing gaskets and glazing tapes.

2.2 ACCESSORIES

.1 Setting blocks: neoprene EPDM silicone, 80-90 Shore A durometer hardness to ASTM D 2240, length of 25 mm for each square meter of glazing minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height to suit glazing method, glass light weight and area.

.2 Spacer shims: neoprene silicone, 50-60 Shore A durometer hardness to ASTM D 2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper; black colour.

.4 Glazing splines: resilient polyvinyl chloride silicone, extruded shape to suit glazing channel retaining slot, colour as selected.

.5 Glazing clips: manufacturer's standard type.

.6 Lock-strip gaskets: to ASTM C 542.

PART 3 - EXECUTION

.1 Laminated glass: 0.38 mm (0.015") PVB interlayer with protective edge treatment where weather exposed.

.2 Wired glass in fire separations: as required by authorities having jurisdiction.

.3 Insulating Glass Units: To CAN/CGSB-12.8, double glazed unit, 25 mm overall thickness, IGMA certified.
.1 Unit edge construction to be manufacturer's standard dual seal, with a thermally broken u-shaped metal spacer.

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
.1 Verify that openings for glazing are correctly sized and within tolerance.
.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
.3 Visually inspect substrate in presence of Departmental Representative.
.4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.5 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 GLAZING SCHEDULE

.1 Windows and Overhead doors:
- .1 Glazing Type G1 (All elevations)
  - .1 25 mm overall hermetically sealed unit
- .2 Outer lite 6 mm
- .3 Inner lite 6 mm clear –security film on surf #4 – refer to elevations for extent of security film.
- .4 Overall performance
  - .1 S.C. = 0.43 – 0.46
  - .2 VLT = 0.69 – 0.70
  - .3 Uc.o.g = 0.290 – 0.295 w/m2
  - .4 Low E on surface #2 or #3
  - .5 All units air filled (no inert gas fill)

.2 Man Doors:
- .1 Glazing Type G2: 7 mm, Georgian wired polished plate glass.

3.4 INSTALLATION: EXTERIOR - DRY METHOD (PREFORMED GLAZING)

.1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.3 Cut glazing tape spline to length; install on glazing light. Seal corners by butting tape spline and sealing junctions with sealant.

.4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.5 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.6 Install removable stops without displacing glazing tape spline. Exert pressure for full continuous contact.

.7 Trim protruding tape edge.

3.5 INSTALLATION: EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.

.3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.5 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line. Place glazing tape on glazing light or unit with tape flush with 16 mm below sight line.

.7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

.8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 INSTALLATION: EXTERIOR - WET METHOD (SEALANT AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Place setting blocks at 1/4 points and install glazing light or unit.

.3 Install removable stops with glazing centered in space by inserting spacer shims both sides at 600 mm intervals, 6 mm below sight line.

.4 Fill gaps between glazing and stops with sealant to depth of bite on glazing, maximum 9 mm below sight line to ensure full contact with glazing and continue air and vapour seal.

.5 Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.7 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape.

3.8 INSTALLATION: INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing tape to length and install against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of light or unit.

.5 Install removable stops, with spacer shims inserted between glazing and applied stops at 600 mm intervals, 6 mm below sight line.

.6 Fill gaps between light and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.

.7 Trim protruding tape edge.

3.9 INSTALLATION: INTERIOR - WET METHOD COMPOUND AND COMPOUND

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Install glazing resting on setting blocks. Install applied stop and centre light by use of spacer shims at 600 mm centres, 6 mm below sight line.

.3 Locate and secure glazing light using spring wire clips glazers' clips.

.4 Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.10 INSTALLATION: PLASTIC FILM

.1 See section 08 87 53 Security Films

3.11 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.1 Remove traces of primer, caulking.

.2 Remove glazing materials from finish surfaces.

.3 Remove labels.

.4 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacturer's instructions.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Requirements.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.12 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 After installation, mark each light with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes:
.1 Security and safety film placed on glass surfaces for increased security protection, to improve resistance to glass breakage.

.2 Related Requirements
.1 Section 08 36 13.02 – Sectional Metal Doors
.2 Section 08 50 00 – Windows
.3 Section 08 80 50 - Glazing

1.2 REFERENCES

.1 American National Standards Institute (ANSI)
.1 ANSI Z97.1-1984(R1994), Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.

.2 International Window Film Association (IWFA)
.1 IWFA Visual Quality Standard for Applied Window Film 1999.

.3 Consumer Product Safety Commission Publications (CPSC)/Code of Federal Regulations (CFR)
.1 CPSC, 16 CFR 1201 CAT II.

.4 General Services Administration (GSA)
.1 GSA-TS01-2003, Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

.5 Government of Canada
.1 Canada Labour Code, WHMIS datasheets.

.6 Underwriters laboratories of Canada (ULC)
.1 ULC-S332-93, Standard for Burglary Resisting Material.
.2 UL-972-02, Burglary resisting Glazing Material.

1.3 DEFINITIONS

.1 Safety: reduction of risk of injury, loss or death of persons due to accidental, natural or unintentional causes.

.2 Security: reduction of risk of injury, loss or death of persons due to intentional actions of others.

1.4 ACTION AND

.1 Submittals in accordance with Section 01 33 00 - Submittal

INFORMATIONAL SUBMITTALS

Procedures.

.2 Product Data: submit WHMIS MSDS - Material Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.1 Submit one 500 x 500 x 4.5 mm sample of film installed on 7 mm thick clear plate glass.

.5 Submit test reports in accordance with Section 01 33 00 - Submittal Procedures.
.1 Submit test reports from approved independent testing laboratory, certifying film's compliance with specified requirements.

.6 Submit Closeout Submittals in accordance with Section 01 78 00 - Closeout Submittals.
.1 Provide operation and maintenance data for window film for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
.2 Follow manufacturer's written instructions for care and maintenance of security and safety film.
.3 Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of security film.

1.5 QUALITY ASSURANCE

.1 Health and Safety:
.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.
.2 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Canada Labour Code.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with section 01 61 00 - Common Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of film flat on cross supports. Do not stand rolls of film on end.

.4 Remove from storage, in quantities required for same day use.

.5 Store materials in accordance with manufacturers written instructions.

.6 Waste Management and Disposal:
.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Workplan.
.2 Place materials defined as hazardous or toxic waste in designated containers.
.3 Ensure emptied containers are sealed and stored safely.

1.7 WARRANTY

.1 Work of this Section 08 87 53 - Security Films 12 months warranty period is extended to 10 years.

.2 Contractor hereby warrants that Security and Safety Film will stay in place without delaminating, peeling or blistering in accordance for 10 years.

.3 Ensure warranty includes items as follows:
.1 Maintaining adhesion properties without blistering, bubbling or delaminating from glass surface.
.2 Maintaining appearance without discolouration.
.3 Removing, replace and reapply defective materials.
.4 In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to Owner.

1.8 MAINTENANCE DATA

.1 Provide operation and maintenance data for window film for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Materials and resources in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

.2 Security Film - General: optically clear polyester film , abrasion resistant coating and release liner.

.3 Type 2 Security Film:
.1 Testing in accordance with GSA-TS01, ANSI Z97.1, and

CPSC 16 CFR 1201 CAT II.

2.2 FABRICATION

.1 Shop installation of security film to glass panels:

.1 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

.2 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems.

.3 View glass from 2.0 m minimum. Report findings to Consultant.

.4 Proceed with Work only after receipt of written approval from Consultant.

.1 Install security film to glass panels ensuring no blisters, bubbles, scratches, edge defects or distortions.

.2 Cut film edges straight and square to within 3 mm of edge of panel.

.3 Deliver glass panels complete with security film installed and labels intact and legible to site in accordance with section 01 61 00 - Common Product Requirements.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Clean glass before beginning installation using neutral cleaning solution.

.2 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.

.3 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

.4 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate or cause vision transparency or distortion problems. Report findings to Consultant.

.5 Proceed with Work only after receipt of written approval from Consultant.

.6 Before beginning Work, place absorbent material at frame to absorb moisture accumulation generated by film application.

3.2 INSTALLATION

.1 Field Installation of Security Film to Glass Windows:

.1 Install film in the same manner as tested.

.2 Remove any window stops and window sealing device.

.3 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.
.4 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.
.5 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems. Report findings to Consultant before starting Work.
.6 Proceed with Work only after receipt of written approval from Consultant.
.7 Install security film to glass windows ensuring no blisters, bubbles, scratches or distortions.

.2 Cut film edges straight and square.

.3 Ensure film is installed behind window stops.

.4 Cut edges 3 mm maximum from edge of glass sealing device in accordance with manufacturers written instructions.

.5 Apply and attach film to glass in accordance with manufacturer's written instructions.

.6 Splicing:
.1 Splice film only when glass is greater in width than film.
.2 Splice film only after receipt of written approval from Departmental Representative.
.3 Use butt overlapped factory edges only.
.4 Ensure maximum overlap of 3 mm.

.7 Use only water and film slip solution on glass to facilitate positioning of film.

.8 Ensure removal of excess water from between film and glass.

.9 Remove left over material form work area and return work area to original condition.

3.3 INSTALLER'S INSPECTION

.1 Visual Inspection: in accordance with IWFA - Visual Quality Standard for Applied Window Film.

.2 Remove and replace without glass replacement, film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 m minimum after 30day period.

3.4 FINAL CLEANING

.1 Wash interior and exterior of each glass panel and film using cleaning solution recommended by film manufacturer.

3.5 VERIFICATION

.1 Verification requirements in accordance with Section 01 47 15 - Sustainable Requirements: Contractor's Verification, include:

.1 Materials and resources.
.2 Storage and collection of recyclables.
.3 Construction waste management.
.4 Resource reuse.
.5 Local/regional materials.
.6 Low-emitting materials.

END OF SECTION